



Site: 028 Canal Builder's Campsite
(99-465-1-6)



Site: 028 Canal Builder's Campsite
(99-465-1-7)



Site: 028 Canal Builder's Campsite
(99-465-1-8)



Site: 028 Canal Builder's Campsite
(99-465-1-9)

Attachment B

Supporting Information for Site #028

[illegible]

Richardson, Cary

From: Paarmann, Marilyn
Sent: Wednesday, March 07, 2001 12:04 PM
To: Richardson, Cary
Subject: FW: Not sure if this is what you needed. Let me know....

-----Original Message-----

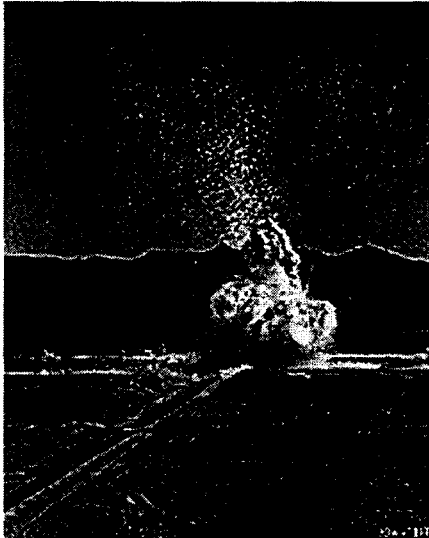
From: Thomas J Haney/TJH4/CC01/INEEL/US [mailto:TJH4@inel.gov]
Sent: Tuesday, March 06, 2001 10:26 AM
To: marilyn_paarmann@id.wpi.org
Subject: Not sure if this is what you needed. Let me know....

The Land Mine and Fuze Burn Area is being evaluated under the WAG 6 and 10 OU 10-04 Comprehensive RI/FS. Unexploded ordnance was removed from this site during removal actions in 1996 and 1997, but UXO clearance is not complete. In addition, TNT and RDX residuals and contaminated soil are present that could pose a risk to human health and the environment.

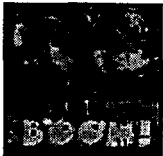
TRINITROTOLUENE (TNT)

*This web page is the result of an assignment for a User/System Interface Course in the Graduate School of Library and Information Sciences at the University of Texas at Austin.

"Trinitrotoluene, commonly known as TNT, is a constituent of many explosives, such as amatol, pentolite, tetrytol, torpex, tritonal, picratol, ednatol, and composition B. It has been used under such names as Triton, Trotyl, Trilite, Trinol, and Tritolo. In a refined form, TNT is one of the most stable of high explosives and can be stored over long periods of time. It is relatively insensitive to blows or friction. It is nonhygroscopic and does not form sensitive compounds with metals, but it is readily acted upon by alkalies to form unstable compounds that are very sensitive to heat and impact. TNT may exude an oily brown liquid. This exudate oozes out around the threads at the nose of the shell and may form a pool on the floor. The exudate is flammable and may contain particles of TNT. Pools of exudate should be carefully removed. TNT can be used as a booster or as a bursting charge for high-explosive shells and bombs". **This information is courtesy of the Ordnance Shop which is a web site dedicated to Navy and Marine Corps Aviation Ordnance.



**The photo is courtesy of the Engineering Analysis Group at the Los Alamos National Laboratory in Los Alamos, New Mexico.



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This page by David N. Locksley and you can email me your comments at: dlocks@mail.utexas.edu>
Thanks!

An inhalation reference concentration (RfC) for TNT has not been derived.

Limited information is available on the reproductive or developmental toxicity of TNT to animals or humans following inhalation exposures. Information from occupational exposure studies suggests that TNT may cause menstrual disorders and male impotency (Zakhari and Villaume 1978, Jiang et al. 1991).

No epidemiological evidence is available showing an association between chronic TNT exposure and tumorigenicity in humans. In animal carcinogenicity studies, a significant increase in urinary bladder papillomas and carcinomas was seen in female F344 rats dosed with 50 mg TNT/kg/day for 24 mo (Furedi et al. 1984a). This study was used by EPA to calculate a slope factor of $0.03 \text{ (mg/kg/day)}^{-1}$ (EPA 1991). TNT is classified in weight-of-evidence Group C, possible human carcinogen (EPA 1991a, b).

1. INTRODUCTION

2,4,6-Trinitrotoluene (TNT) is a yellow crystalline solid used as a high explosive in military armaments and as a chemical intermediate in the manufacture of dyestuffs and photographic chemicals (Sax and Lewis 1987). It is slightly soluble in water (104 to 113 mg/L) and soluble in alcohol, ether, acetone, benzene and carbon disulfide (EPA 1990). It has a density of 1.654 g/mL, a vapor pressure of 8.02×10^{-6} mm Hg at 25°C, and a log K_{ow} of 1.60 (EPA 1990).

TNT is likely to enter the environment in wastewater effluents from production facilities and from leachates at waste disposal sites. Direct photolysis (half-life 14 hr) and microbial degradation are expected to be the major loss pathways. Mobility in soil may be limited by strong adsorption to soil particles. Volatilization to the atmosphere from water or soil is not expected to be significant (EPA 1990).

2. METABOLISM AND DISPOSITION

2.1. ABSORPTION

TNT is absorbed through the gastrointestinal tract, the skin, and the lungs. Studies on laboratory animals dosed with radiolabeled TNT have shown that rates of absorption, as indicated by the 24-hr recovery of radioactivity in the urine, can be as high as 74.3% following oral dosing and 52.8% after dermal exposures. Following intratracheal dosing to rats, urinary recovery was 12.7 to 19.3% after 4 hr (El-hawari et al. 1981).

2.2. DISTRIBUTION



ToxFAQs

RDX

CAS# 121-82-4

September 1996

RDX
 $C_3H_6N_6O_6$
[Stereo Image](#)
[XYZ File](#)

[NFPA Label Key](#)

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about RDX. For more information, you may call the ATSDR Information Center at 1-800-447-1544. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: RDX is an explosive. Few people will be exposed to RDX. Exposure to large amounts can cause seizures. RDX has been found in at least 16 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is RDX?

RDX stands for *R*oyal *D*emolition *eX*plosive. It is also known as cyclonite or hexogen. The chemical name for RDX is 1,3,5-trinitro-1,3,5-triazine. It is a white powder and is very explosive.

RDX is used as an explosive and is also used in combination with other ingredients in explosives. Its odor and taste are unknown. It is a synthetic product that does not occur naturally in the environment. It creates fumes when it is burned with other substances.

What happens to RDX when it enters the environment?

- Particles of RDX can enter the air when it is disposed of by burning.
- RDX can enter the water from disposal of waste water from military ammunition plants, and it can enter water or soil from spills or leaks from improper disposal at these plants or at hazardous waste sites.
- RDX dissolves very slowly in water, and it also evaporates very slowly from water.
- It does not cling to soil very strongly and can move into the groundwater from soil.
- RDX can be broken down in air and water in a few hours, but it breaks down more slowly in soil.
- RDX does not build up in fish or in people.

How might I be exposed to RDX?

Few people will be exposed to RDX. Fewer than 500 people are known to work with RDX. These people can be exposed by:

- Breathing dust with RDX in it
- Getting RDX on their skin
- Drinking contaminated water or touching contaminated soil near factories that produce RDX.

How can RDX affect my health?

Animal testing is sometimes necessary to find out how toxic substances might harm people or to treat those who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

RDX can cause seizures (a problem of the nervous system) in humans and animals when large amounts are inhaled or eaten. The effects of **long-term** (365 days or longer), **low-level exposure** on the nervous system are not known. Nausea and vomiting have also been seen. No other significant health effects have been seen in humans.

Rats and mice have had decreased body weights and slight liver and kidney damage from eating RDX for 3 months or more.

It is not known whether RDX causes birth defects in humans; it did not cause birth defects in rabbits, but it did result in smaller offspring in rats. It is not known whether RDX affects reproduction in people.

How likely is RDX to cause cancer?

The EPA has determined that RDX is a possible human carcinogen.

In one study, RDX caused liver tumors in mice that were exposed to it in the food. However, carcinogenic effects were not noted in rat studies and no human data are available.

Is there a medical test to show whether I've been exposed to RDX?

Medical tests are available that can measure RDX levels in your blood or urine. However, these tests can only be used if you have come in contact with RDX in the last few days. These tests can determine if you have been exposed to RDX, but they cannot tell how much RDX entered your body, or determine **long-term** health effects from RDX.

These tests aren't available at most doctors' offices, but can be done at special laboratories that have the right equipment. However, they cannot be used to determine **long-term** health effects from RDX.

Richardson, Cary

From: Broughton, Stephen
Sent: Monday, April 23, 2001 2:47 PM
To: Richardson, Cary
Subject: C-4

Composition - 4 is a plastic demolition explosive consisting of RDX, other explosives, and plasticizers. It can be molded by hand for use in demolition work and packed by hand into shaped charge devices. Two common types of C-4 are the M112 and M118 charges. The M112 block demolition charge consists of 1.25-pounds of Composition C4 packed in a Mylar-film container with a pressure-sensitive adhesive tape on one surface. The tape is protected by a peelable paper cover. In blocks of recent manufacture, Composition C4 is white and packed in an olive-drab, Mylar-film container. The M118 block demolition charge is designed as a cutting charge especially to be used against steel targets. The sheets of explosive can be quickly applied to irregular and curved surfaces and easily cut to any desired dimensions. The M180 Cratering Demolition Kit is a one-step, two-stage, surface-emplaced, 110-pound kit consisting of a standard 15-pound shaped charge, a firing device and a rocket-propelled 40-pound cratering charge. These components are mounted on one leg of a tripod assembly. When the kit is fired, the rocket on its downward acceleration strikes the firing device, which initiates the shaped charge through the demolition circuit. The shaped charge creates a hole in the ground to a depth of 6-9 feet. The accelerating rocket "follows through" the shaped charge back blast to the bottom of the hole, and penetrates further into the soil to an optimum charge burial depth. A time delay fuse detonates the cratering charge and produces a 12-22 foot diameter crater.

**Stephen E. Broughton
WPI
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208-528-2406**

The Ordnance Shop

Composition C

Composition C is a plastic demolition explosive consisting of RDX, other explosives, and plasticizers. It can be molded by hand for use in demolition work and packed by hand into shaped charge devices. Although compositions C-3 and C-4 are the only formulations presently being used, C-1 and C-2 may still be encountered.



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